347
Hemerocampa pseudotsugata FIR.
SURVEYS NOT FOR PUBLICATION

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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
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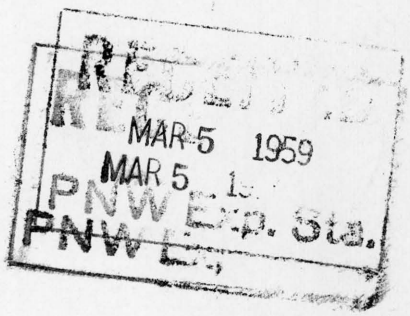

Douglas-fir Tussock Moth Situation in Owyhee County, Idaho 1958

By

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Pretty neat appraisal job

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DOUGLAS-FIR TUSSOCK MOTH SITUATION IN OWYHEE COUNTY, IDAHO 1958

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HISTORY

Occurrence of the Douglas-fir tussock moth[1/] on Douglas-fir and true fir in the Owyhee Mountains has been sporadic but highly interesting. The first recorded outbreak occurred in 1951 on approximately 10,000 acres. A report following surveys stated that tree mortality might occur within the more heavily defoliated areas. However, in 1952 no tussock moth larvae were found, but groups of sawfly larvae were quite common feeding on the new needles of Douglas-fir. This situation, sawflies but no tussock moths, occurred at an endemic level throughout the entire area that was defoliated in 1951. Quite a few dead trees were observed in areas first defoliated, but the tussock moth infestation subsided by the spring of 1953. The cause of this reduction in population was not determined at that time.

In August 1956 tussock moth infestations were reported again in the Owyhee Mountains. Defoliation was far from being complete, but ranged from 60 to 70 percent. A high degree of parasitism was quite evident.

The area was checked again in 1957 and populations of tussock moths were found to be continuing, pupal parasitism was only 19.5 percent, and defoliation was less than 50 percent. Sawfly larvae were also present in what appeared to be increasing numbers. At this time control by aerial spraying was recommended and plans for such were formulated. A high degree of cooperativeness was shown by the owners and land managing agencies involved. These included private owners, State of Idaho, Bureau of Land Management, and Forest Service.

During a post-survey trip through the infested area late in 1957 dead mature tussock moth larvae and pupae presenting symptoms of virus disease were found and collected. It has since been observed that in the field these tussock moth populations do not succumb to this virus until quite late in the mature larval and pupal stages. Consequently the 1957 survey was probably made too early to detect the presence of this disease.

1/ *Hemerocampa pseudotsugata* (McD.)

In February 1958 the presence of the virus within the larval collections was confirmed by Dr. E. A. Steinhaus, Laboratory of Insect Pathology, Berkeley, California. As a result of this information, plus additional work and laboratory observations on the virus during the winter, the decision was made to cancel the control plans.

PRESENT SITUATION

During the season of 1958, biological observations were made of the infestation each month from June through October[2/]. These observations revealed quite certainly that the tussock moth population was declining in all areas except around Delamar. This was to be expected since no diseased larvae were collected from this area in 1957. Sawfly larvae, though of lesser abundance, were collected within all areas sampled for tussock moths.

In October 1958 the areas wore surveyed for combined feeding of tussock moths and sawflies but only for tussock moth pupal populations. This sawfly in all probability overwinters in the egg stage but too few eggs were found to warrant a survey based on this stage.

Table 1 shows the results of the survey for 1957 and 1958.

Table 1. Comparison between defoliation and pupal population--Douglas-fir tussock moth, 1957-1958

Area	Percent of defoliation		Average number pupal cases/15-inch twig	
	1957	1958	1957	1958
Ymir Mine	Not sampled	18	Not sampled	0.23
Silver City	52	5	9.0	0
Delamar	Scouted-light	73	Scouted-light	0.47
South Mountain	50	14	15.5	0

2/ Dr. E. C. Clark, Insect Pathologist, University of Idaho, assisted with the observations in June and accomplished the August trip alone due to conflicting schedules. The author is appreciative of his assistance and cooperation.

All areas sampled showed a considerable reduction in amount of tussock moth feeding and pupal population in 1958, except for Delamar. This was a "disease-free" area in 1957, consequently the resulting 73 percent degree of defoliation. However, the low average of pupal cases per 15-inch twig possibly reflects that the virus gained control of the larval population late in the season, after the damage had been practically completed.

The larval population within the Ymir Mine area was not sampled in 1957, but the observations in June and August of 1958 indicated that a high population of tussock moth could be expected. This did not occur and again it was ascertained that the virus was the controlling factor.

The Silver City and South Mountain areas contained high populations in 1957, both in host larvae and incidence of disease. As was expected, the larval population had completely subsided by the fall of 1958.

Observations made in June 1958 indicated that a high sawfly population might be expected. However, this did not materialize as no appreciable damage was evident during the October survey. The amount of reduction during the larval stages of this sawfly population is not now known. Since the early instar larvae feed gregariously, the finding of these groups led to an overestimation of probable pupal and egg populations.

NOTES ON THE VIRUS

On March 24, 1958, egg mass collections were made for rearing purposes. However, only 3 larvae out of some 200 survived. The cause of death was ascertained to be a virus. In nature, egg hatch occurred around June 1, and on June 9 larval collections were made. Again the virus was successful in practically eradicating these rearings, thus increasing the virus supply from diseased specimens. The few (22) pupae that survived were placed under refrigeration for future rearings. Egg mass collections from the infested areas were again made in October 1958 in order to test the effect of the virus on this species.

In all cases, the tussock moth did not succumb to the virus until the late larval and pupal stages. The diseased individuals were placed in a container to rot, and thus obtain a supply of virus. The stock solution was later quick frozen and stored for future use.

Virus concentrations were determined at intervals throughout the rearings and are shown in table 2.

Table 2. Virus concentrations determined during the tussock moth rearings

Phase sampled	Polyhedra bodies per milliliter
Egg mass	760,000
1st instar larvae	100,000
2nd instar larvae	560,000
Mature larvae	8,200,000
Frass	1,680,000

Rearings were accomplished best by using the cage-tray method reported by A. P. Randall[3/]. No nutrients were needed to keep the Douglas-fir foliage fresh.

DISCUSSION

The Douglas-fir tussock moth infestation in the Owyhee Mountains appears to be subsiding in all areas except near Dolamar, Idaho, the only disease-free infestation found in 1957. However, evidence points to the virus being present within this area in 1958.

No tree killing of Douglas-fir or true fir due to defoliation has been noted during the past 2 years. Surveillance of this infestation will be continued.

It is hoped that an experimental control study to determine the virus concentration and dosage needed can be accomplished in 1959. Of course, such a study is dependent upon acquiring sufficient stock concentrate of the virus and the existence of a disease-free tussock moth infestation.

3/ Plastic rearing cage for maintaining fresh conifer foliage for insect rearing. Canad. Ent. 89(10): 448-449. 1957.

DOUGLAS-FIR TUSSOCK MOTH SAMPLE PLOTS

OWYHEE COUNTY, IDAHO

1958

LEGEND

- (3) Plots Sampled - 1957
- (2) Plots Sampled - 1958
- C Area of Infestation - 1957
- 13 Area of Infestation - 1958